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# *Note with respect to the Invention of the Achromatic Telescope.*
## By A. C. Ranyard.

At a recent meeting of the Astronomical Society I mentioned that there was no account to be found in the Law Reports of the time of the action brought in 1766 by Peter Dollond, the son of John Dollond, against Champness, an optician in Cornhill, for infringing John Dollond's patent for making achromatic telescopes. The importance of any contemporary reference to this action arises from the fact that Champness, in his defence, proved to the satisfaction of Lord Mansfield that achromatic telescopes had been made by Mr. Moor Hall in 1733, that is, twenty-five years previously to the date of John Dollond's patent. It is known* that evidence was given by workmen who had been employed by Mr. Moor Hall to make achromatic lenses for him, but it is not known whether the workmen actually came into Court and were cross-examined, or whether their evidence was given by affidavit.

Mr. C. T. Martin saw a report of the discussion at the Astronomical Society's meeting, and wrote to suggest to me that I should search the Common Law Judgment Rolls preserved in the Record Office. I was under the impression that the action had been tried in the Court of King's Bench; for we know from subsequent references to the case that it was tried before Lord Mansfield, who was Chief Justice of the King's Bench, from the date of his appointment in November 1756 on till 1788. There is in the library of the Record Office a complete index of the actions tried during this period in the Courts of King's Bench and Common Pleas. I therefore searched the index of cases in the King's Bench for the names Dollond and Champness, but with no success, and I was about to give up the search, when the librarian suggested to me that Lord Mansfield might have sat to relieve a judge in another Court, and he suggested that I should search the index of cases in the Court of Common Pleas. There I found in the list of actions tried in the Easter Term of the seventh year of George III. the entry:—

> *James Champneys*, late of London, optician, to answer Peter Dollond, administrator of John Dollond. Damages £204. H. 6 Geo. III. 626 Middx.

The latter figures refer to the record of Judgments. On sending for the Judgment Roll for the Easter Term of 7th Geo. III. I found that Judgments numbered 622 to 627 were missing, and on searching through the file of affidavits made in the Common Pleas in Easter Term of 7th Geo. III. I was

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* For references with respect to this evidence see *Astronomical Register* for 1881, pp. 196, 197.

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unable to find any referring to the matter. The next day, on turning to the short notice of the decision given in the *Gentleman's Magazine* for 1766, p. 102, I found that judgment was given on Tuesday, February 18, 1766, which would correspond to the 6th year Geo. III., and I concluded that I must have made a mistake of a year in the index reference in the Record Office library. On sending for the Judgment Roll for Hilary Term of 6th Geo. III. I found that, by a curious coincidence, Judgments 622 to 627 were again missing. There seems to be no connection between the two Rolls. The librarian informed me that at that period registration of judgments was not compulsory, and as a small fee was charged for registration, several of the judgments—perhaps one in five—are missing.

By the courtesy of Mr. Selby, the Chief Librarian, I was allowed to have all the Common Pleas documents, consisting of *posteas* and *affidavits* for the years 1765, 1766, and 1767, in a private room to search at my leisure. The search occupied some days, as there were nine sacks full of *posteas*, and I went through all the affidavits without trusting to the rough alphabetical arrangement in which they have been stored. But I found nothing referring to the case of Dollond *v.* Champness. I was, however, rewarded by finding affidavits in two other actions brought by Peter Dollond against opticians to recover damages for infringing his father's patent. These actions seem to have been brought subsequently to the test case against Champness, or Chumpneys, and to have been settled as a matter of course. The affidavits only refer to formal matters connected with the service of writs, but they serve to show that at least three opticians besides James Champness had acted on the supposition that Dollond's patent would not be upheld.

Before judgment was given in Dollond *v.* Champness, Peter Dollond had commenced an action against Francis Watkins and Addison Smith as joint defendants. They are described as both of St. Martin's Lane, opticians. Subsequently Peter Dollond commenced an action against Henry Pyefinch, who is described as an optician of Cornhill. The affidavits in the first of these actions will be found filed under 'Dollond' in Easter Term of 6th Geo. III., and an affidavit in the second action under 'Dollond' in Michaelmas Term of 8th Geo. III. In both actions Messrs. Edmonson and Potts, of Bury Street, acted as attorneys for Peter Dollond. They were therefore probably the attorneys for Dollond in his action against Champness. The fact is worth noting, as papers connected with the case may have been preserved by the firm. A member of Mr. Dollond's family informed me some years ago that he had made inquiries, and believed that no papers referring to the case had been preserved by the Dollonds.

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## *On the Superiority of Zinc and Steel Pendulums.*

By Thomas Buckney.

At the last meeting of the Royal Astronomical Society, Dr. Leonard Waldo, of Yale College, U.S.A., was good enough to give us an account of certain improvements in astronomical clocks, or, as he preferred to call them, "clocks of precision." The net result of these improvements was stated to be a reduction of about 25 per cent. in the average errors of clock rates, and this as compared with the best previously existing clocks. This, if substantiated, would be a most important gain; but, unfortunately, Dr. Waldo gave us no figures in support of his statement, which, therefore, goes for nothing more than a mere expression of his own individual opinion. Now I cannot help thinking that when a statement of this kind is made to such a Society as this, it ought, to have any value, to be accompanied by the data on which it is founded, so that anyone interested in the matter may be able to weigh the facts and verify the deductions made from them. In the absence of such data we can only discuss the methods adopted, and endeavour to satisfy our own minds that they would probably produce the result said to be attained.

Now, the Yale clock or clocks which appear to have been constructed under Dr. Waldo's direction embody the following features, and it is to them that he attributes their excellent performance. They have:

1st. A heavy mercurial pendulum, the mercury weighing from 45 to 60 lbs. The jars containing the mercury and the pendulum rods are of steel.

2nd. The suspension of the pendulum is on a knife-edge, in lieu of the spring commonly used.

3rd. The escapement is a modification which is stated to be an improvement of one of the forms of Denison's Gravity Escapement.

4th. The support of the pendulum is a massive iron arch spanning two piers of masonry similar to the piers of a transit instrument, and it is between these piers that the pendulum swings. The clock movement is supported on a bracket placed between the piers, around which some arrangement of steam pipes is introduced for the purpose of regulating the temperature.

Well, now, the first thing that crosses one's mind is that some of these improvements are old acquaintances. Let us see, therefore, what is known about them, taking each one in the order already given. In order not to weary you I will, if possible, confine my references to one little book, which, although it has run through several editions and was written by a gentleman who is a Fellow of this Society, Dr. Waldo must, I think, imagine that few of us have seen. Perhaps Dr. Waldo himself